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Does Agrotourism Benefit Mountain Farmers? A Case Study in Phu Ruea District, Northeast Thailand

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Agrotourism is widely advocated as a useful strategy to develop mountain agriculture and improve farmers' income and quality of life.

However, the relationship between agriculture and tourism is complex, and the extent to which

tourism benefits farmers remains uncertain. This paper examines the relationship between agriculture and tourism and assesses to what extent agrotourism benefits farmers in Phu Ruea district, a popular tourist destination in the mountains of northeast Thailand. The Phu Ruea agrotourism system generated gross income for the district of almost US\$ 16 million in 2014. About 80% of this income came from sales from specialty-crop farms and of tourism services operated by the households of local farms. The agrotourism

system also created many employment opportunities for local people. There were 1500 people directly involved in the system, 90% of whom were farmers or members of farm households. Thus, there is no doubt that many local farmers derive significant benefits from their involvement in the agrotourism system. Although the Phu Ruea agrotourism system can be seen as a successful strategy for developing mountain agriculture, agrotourism is not a magic strategy to solve all the problems of rural development in the mountains. Only some localities are attractive to tourists, and only some farmers have the knowledge, skills, and resources to take advantage of the opportunities offered by tourism.

Keywords: Mountain area development; agricultural intensification; specialty cropping; agricultural diversification; income flows; employment generation; Thailand.

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Introduction

Agrotourism is a hybrid type of agricultural system that merges elements of farming and tourism to create markets for farm products and services and provide travel experiences for tourists (Wicks and Merrett 2003; Rogerson and Rogerson 2014). Other labels for this system, including "agricultural tourism," "agritourism," "farm tourism," "farm-based tourism," "farm stays," "vacation farms," "agritainment," and "rural tourism," are largely synonymous (Phillip et al 2010; Kokko 2011; Schilling et al 2012; Flanigan et al 2014). Agrotourism, which has existed in Europe, North America, and other parts of the "global North" for many years (Busby and Rendle 2000), has more recently gained growing attention in developing countries, including Thailand (Brscic 2006; Na Songkhla and Somboonsuke 2013; Choo and Petrick 2014; Rogerson and Rogerson 2014; Shaffril et al 2015). Although it would seem to be a useful strategy to develop mountain agriculture and improve farmers' income and quality of life, there has been relatively little research directed at mountain agrotourism in

developing countries, including in Southeast Asia (Ariffin 2014).

The relationship between tourism and agriculture is complex, and the extent to which tourism benefits farmers remains uncertain. Some agrotourism research has found that agriculture and tourism are mutually beneficial (Fleischer and Tchetchik 2005; Choo and Petrick 2014), but other studies have raised questions about the extent to which agriculture and tourism are truly symbiotic. In some cases, tourism may benefit agriculture by creating market opportunities for farmers to sell their products directly to tourists (Hjalager 1996; Srisomyong 2010; Torres and Momsen 2011). It may provide an incentive to farmers to diversify into producing high-value crops to meet new tourist demand (Hermas 1981; Bowen et al 1991; Cox et al 1995; Rilla 2011) and a secondary source of income to farmers who find part-time employment in the tourism service sector (Che and Wargenau 2011; Na Songkhla and Somboonsuke 2012; Schilling et al 2014; Shaffril et al 2015). Jeczmyk et al (2015) also found that around 28% of total farm household incomes were derived from agrotourism

activities. But in other cases, the relationship between agriculture and tourism is not mutually beneficial. Fleischer and Tchetchik (2005) found that agricultural activities did not provide significant benefits for tourism but that farmers benefited from selling their products to tourists at higher prices. Brscic (2006) reported that the development of agrotourism activities in Croatia did not significantly enhance the diversity of crops or improve agricultural production. In some situations, development of tourism was detrimental to local agricultural communities because of competition for labor, land, water, and investment (Torres and Momsen 2011). The tourism sector's high demand for labor and land can divert these resources from the agricultural sector (Bowen et al 1991; Torres and Momsen 2011). The move by farm laborers to work in tourism enterprises had negative impacts on agricultural production in Yucatan, Mexico. The high demand for laborers in the tourism sector meant that farmers had to pay very high wages to attract workers, causing some farmers to give up working in agriculture altogether and others to become part-time farmers (Torres 2011).

In Thailand, agrotourism has been officially promoted since 1999 to generate additional income for farmers, provide new occupations for unemployed people, and enhance local rural economies (Srisomyong 2010). The Department of Agricultural Extension, in cooperation with the Tourism Authority of Thailand, launched an agrotourism project with funding of 125 million baht (approximately US\$ 4 million at the time) to develop and promote agrotourism destinations in several parts of the country (Srisomyong 2010). In 2012, more than 400 villages were officially promoted as agrotourism destinations (Na Songkhla and Somboonsuke 2012). However, although agrotourism has existed in Thailand for more than a decade, no detailed studies of the extent to which it benefits farmers have been published. Similarly, while there is a growing body of literature on many aspects of agrotourism in different countries in the world, relatively little has been published on its benefits, especially to local farmers (Jeczmyk et al 2015).

In this paper, we conceptualize agrotourism as an agricultural system. We identify all key components of the system and the interactions that occur among them, especially flows of cash and labor, using a system approach (Rambo and Sajise 1984; Conway 1985; Marten 1986; McConnell and Dillon 1997). This allows us to measure the extent of both direct and indirect benefits received by farmers. The study was conducted in Phu Ruea district in the mountains of Loei province in northeast Thailand, one of the country's major agrotourism centers.

This study provides detailed empirical information about an important agrotourism site in Thailand that has not been previously described. It also illustrates the use of the agricultural system approach to analyze the structure and functions of an agrotourism system. This study should

be of interest both to the mountain research community and to policy-makers concerned with the development of mountain areas.

Methodology

Study area

Phu Ruea district is located in Loei province (Phu Ruea district office, 17°27'18"N, 101°21'48"E; Figure 1) in the Northern Petchabun mountain range in northeast Thailand. The district covers about 88,800 ha, with 70% of its total land area at an elevation higher than 700 masl (Jarvis et al 2008). The climate is tropical savannah, according to the Köppen classification (Mongkolsawat et al 1994). Average annual rainfall for a 13-year period (2000–2012) was about 1300 mm, with the rainy season occurring from May through September and a prolonged dry season during the rest of the year. The average maximum and minimum temperatures are about 40 and 9°C, respectively (National Statistics Office 2013). The winter season in Phu Ruea is unique in the northeast because of its cold temperatures (a record low of -0.3°C was recorded in 1974). The cold weather and occasional occurrence of hoarfrost (*mae-kavang*), which is often reported in Thai newspapers, are part of what makes Phu Ruea so attractive to Thai tourists from the always-warm lowlands.

There were 18,916 residents living in the district in 2014 (Department of Provincial Administration 2015). Agriculture is the main occupation. Major crops cultivated include maize; cassava; rice; rubber; ginger; fruits such as lychee, longan, sweet tamarind, and strawberries; shiitake mushrooms; and ornamental plants and exotic flowers (Choenkwan et al 2014).

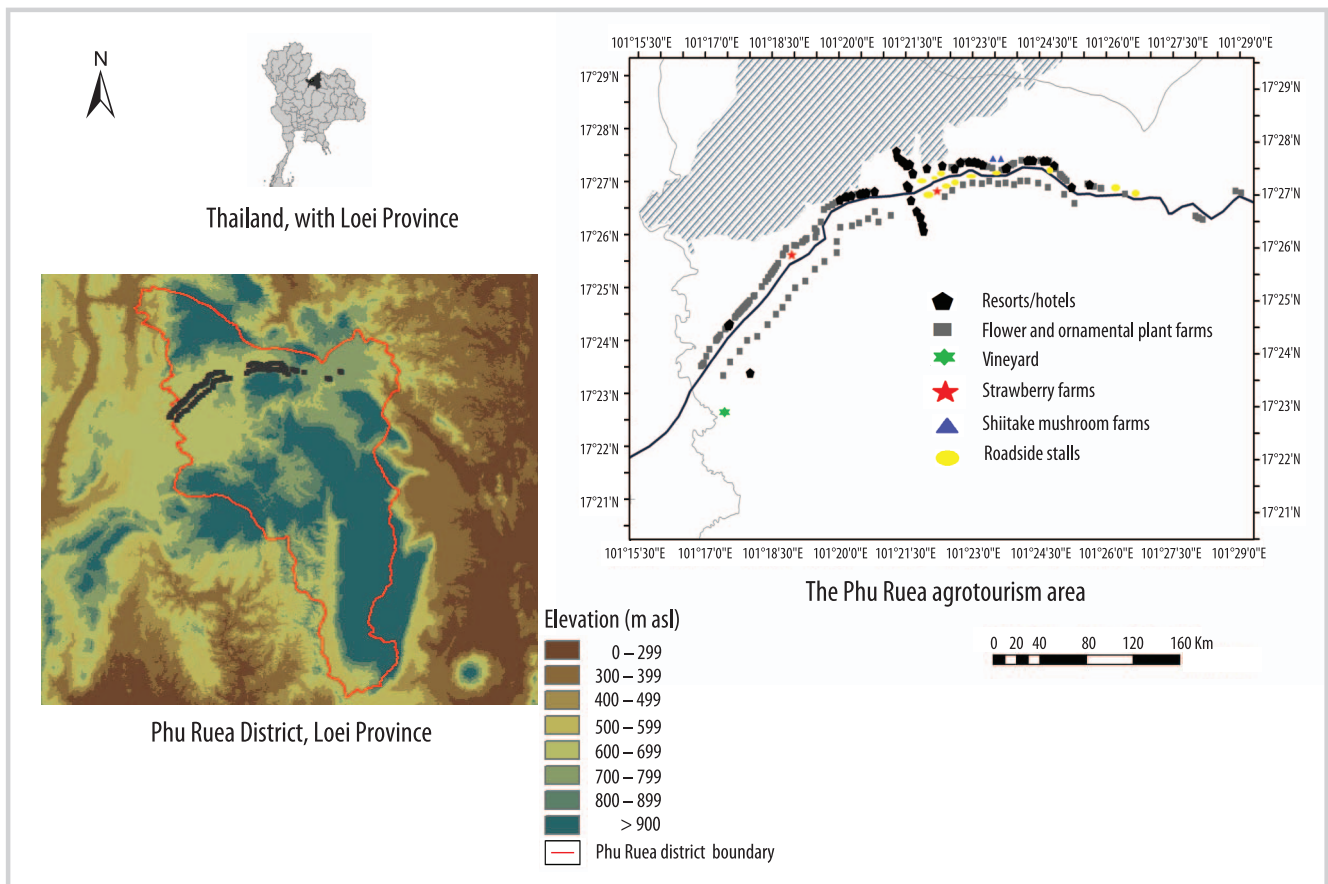
Data collection and analysis

Data for this study were obtained from several sources, including information from government records and offices, onsite observation of specialty-crop farms and agrotourism enterprises, and semistructured interviews with key individual informants. The use of multiple sources and data collection methods was necessary to understand the complex structure and functioning of the agrotourism system in this district.

Information about the background of the study area, agricultural activities, and promotion of agrotourism was obtained from local government agencies, including subdistrict administrative organizations and the Phu Ruea Municipality Office, Phu Ruea District Office of Agriculture Extension, Phu Ruea District Office, Phu Ruea District Office of Community Development, Loei Provincial Office of Agriculture Extension, and Loei Provincial Office of the Comptroller General.

Field research was conducted in the district during January 2014, March 2014, and May 2015 for 2 weeks at a time to investigate how agrotourism functions within Phu Ruea's agricultural system. Detailed information on

FIGURE 1 Location of the Phu Ruea district agrotourism system. (Map by Sukanlaya Choekwan)



individual farms and tourist enterprises was collected using semistructured interviews with 81 key informants. These consisted of 15 village headmen, 17 specialty-crop farmers, 4 local officials, 40 businesspeople (26 hotel and resort owners, 2 restaurant owners, 2 souvenir shop owners, 5 roadside stall sellers, 3 souvenir producers, and 2 car-rental operators), and 5 hired workers. The farmers, businesspeople, and hired workers were selected because they were knowledgeable and willing to answer our questions. The village headmen were selected from villages that had hotels, resorts, restaurants, and tourist spots. The local officials were selected because they were responsible for agriculture or agrotourism promotion. The interviews consisted of informal conversations with questions about characteristics of activities, expenses and income from the activities, employment opportunities, and number of people engaged in each agrotourism activity. Interviews varied in length from 30 to 120 minutes. Data were entered into a Microsoft Excel database, which included detailed information on each farm and tourist enterprise, ie area, number of employees, length of time in operation, gross income, and costs. This database was used to create a matrix table to examine the interactions among the system components.

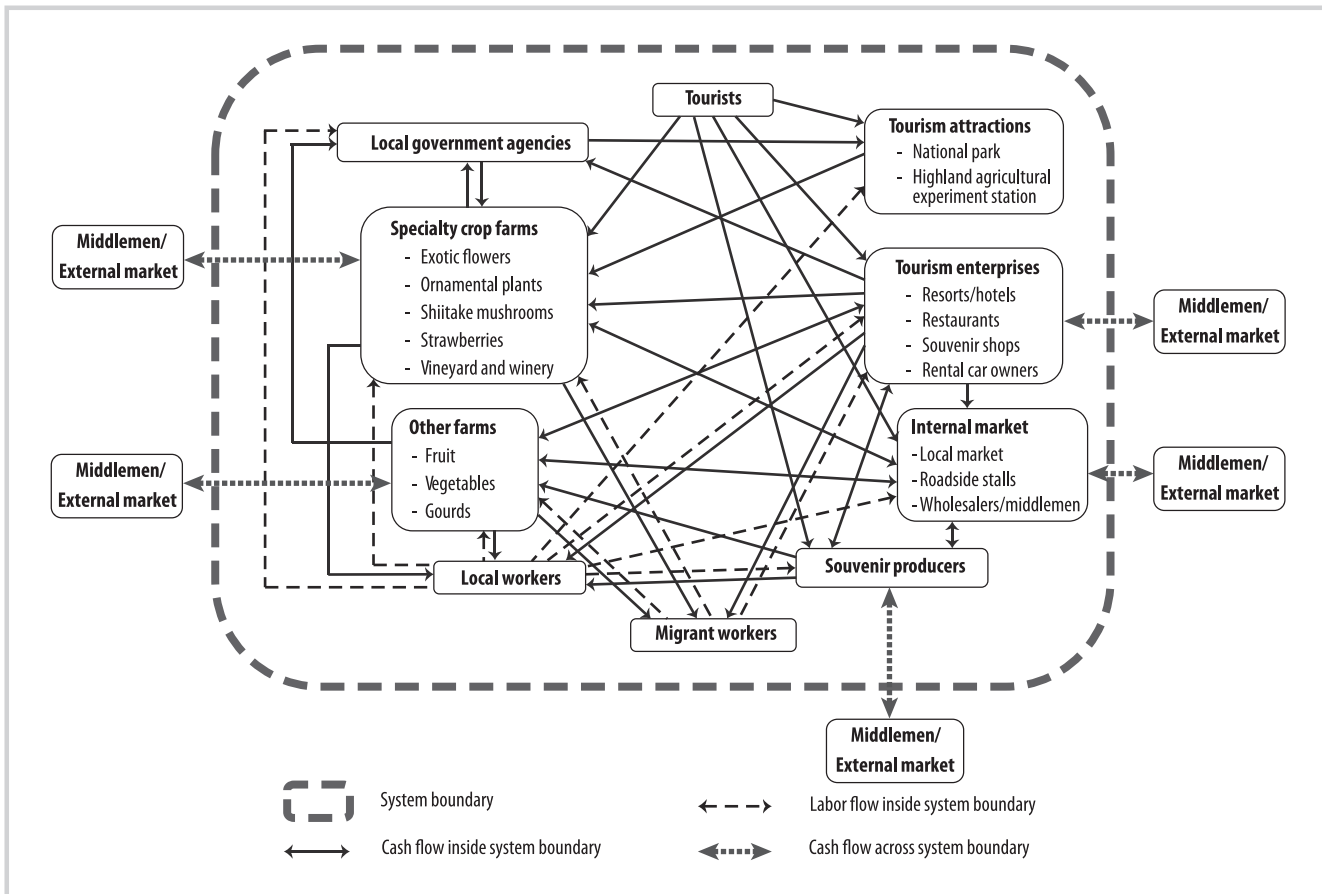
Results and discussion

The history of the development of agrotourism in Phu Ruea

Phu Ruea district has been a popular destination for Thai tourists since the establishment of Phu Ruea National Park in 1979. The district is also well known for growing ornamental plants, exotic flowers, and shiitake mushrooms, as well as for being the site of the country's first large vineyard and winery. These specialty crops have been grown in the district since the early 1990s.

Although Phu Ruea National Park was established in 1979, the first tourism enterprises in Phu Ruea were only started in 1992. According to Chamroonsiri (2002), during 1992–1996, some villagers sold their land to outsiders at a high price. These in-migrants were entrepreneurs who sought to develop new businesses in the area, such as hotels, resorts, restaurants, shiitake mushroom farms, orange orchards, vineyards, and ornamental plant and flower farms. Some people who sold their land became workers on these farms and learned how to grow mushrooms, ornamental plants, and flowers, and later they used their knowledge of these high-value crops to begin growing them on farms that they established on rented land.

FIGURE 2 A model of the Phu Ruea agrotourism system.



The Loei Provincial Agricultural Extension Office officially began to promote agrotourism in Phu Ruea in 2001. The Tourism Authority of Thailand, in cooperation with the Department of Agricultural Extension, launched an agrotourism project to promote agricultural products in conjunction with tourism and thus develop the local economy. Several agrotourism events were initiated under this project, such as the Phu Ruea winter flower festival. In addition, the Phu Ruea Highland Agricultural Experiment Station was established to carry out research on upland crops and serve as a tourist attraction.

The Phu Ruea agrotourism system

Figure 2 is a model showing the cash and labor flows among the components of the agrotourism system within Phu Ruea district. The system boundary is the district border. Key components are the tourists; government agencies and projects promoting agrotourism; specialty-crop farms; other farms; souvenir producers; roadside stalls, souvenir shops, and local markets; tourism service enterprises such as hotels, resorts, and restaurants; and local and migrant hired workers.

Tourists: No reliable figures are available on the number of tourists visiting Phu Ruea each year, but in calendar year 2013, 171,056 tourists, mostly domestic, visited Phu Ruea National Park (Phu Ruea National Park 2014). In addition, officially organized tour groups of 20–30 people each from about 30 government organizations in other parts of the country visited agrotourism destinations in Phu Ruea district (Nong Bua Sub-district Administrative Organization 2014). There were also many tourists who visited the district on privately organized trips but did not enter the national park, so the total number of tourists visiting Phu Ruea may be close to 200,000 per year. Most tourists visited during October to February, and most stayed for only 1 or 2 nights.

Government agencies and projects: Local government agencies, including the Phu Ruea Municipality, several subdistrict administrative organizations, and the Phu Ruea District Agricultural Extension Office, help to promote agrotourism and distribute information to tourists. They provide financial support to farmer groups to develop their farms as agrotourism attractions, coordinate with farmer groups to arrange for visits by tourists, organize

FIGURE 3 Tourists visiting a flower farm. (Photo by Sukanlaya Choenkwan)



Phu Ruea's winter flower festival, and operate a market selling local handicrafts and agricultural products.

The Phu Ruea winter flower festival is held from November to January at a large flower park established by local government agencies. In addition to flower displays, the festival features flower parades and flower competitions. The flowers and ornamental plants used in this festival are bought from flower farms in the district. According to the responsible official, the budget in 2014 for buying these flowers was about US\$ 57,000. This festival also provides a market for farmers to sell their agricultural products, such as ornamental plants, flowers, vegetables, local fruit, shiitake mushrooms, and handicrafts. There are about 50 locally owned shops selling products at this festival.

Specialty-crop farms: Specialty-crop farms are the main agrotourism destinations. The specialty crops grown in Phu Ruea include exotic flowers and ornamental plants, shiitake mushrooms, strawberries, and grapes. There are 209 farms growing exotic flowers and ornamental plants, such as marigolds, China pinks, roses, white Christmas plants, hydrangeas, poinsettias, bromeliads, African violets, petunias, and phlox. These plants help attract tourists to the area by making the landscape more

beautiful. Tourists can visit farms to learn how these plants are grown and buy them directly from farmers (Figure 3). But tourists are not the main customers for the flower farms, which sell most of their products wholesale to middlemen who come to them from all over Thailand. On average, these farms generate only 10% of their income from direct sales to tourists, although some farms sell most of their products directly to tourists. However, many farmers do not like dealing with tourists, complaining that they take up too much of their time and annoy them by bargaining too much. The farmers also have to provide plastic bags for the tourists to carry away the plants, increasing their costs, whereas when they sell to wholesale buyers they do not need to provide bags. One farmer said, "I don't like to sell the flowers to tourists. I have to provide plastic bags for them, which increases my cost and wastes my time. They usually ask for extra and bargain for a low price." Most farmers sell their products to tourists at the same price as to wholesale buyers, but some charge tourists higher prices.

There are 9 shiitake mushroom farms, all operated by a group of closely related families. Shiitake mushrooms are not usually sold directly to tourists, restaurants, and hotels or resorts but are instead marketed through middlemen in local markets and roadside stalls. Because

shiitake mushroom dishes are a signature of Phu Ruea, however, all restaurants, resorts, and hotels buy mushrooms to serve to their tourist customers. The mushrooms are also sold to middlemen in the market in the provincial capital, accounting for about 30% of total sales. Tourists can visit the shiitake mushroom farms to learn about how the mushrooms are grown, and they can buy mushrooms from the farm if any are left over after supplying the middlemen. Most groups visiting the mushroom farms are organized by government organizations from other provinces that want to learn about growing the mushrooms to develop their own localities. They come to Phu Ruea because the shiitake mushroom farmers there have developed ways to control diseases, which are a threat to successful cultivation of this species. The farmers are remunerated by the local government agencies for hosting these visits.

There are 2 small strawberry farms in the district that were established within the past 5 years. The farmers came to the district from northern Thailand, where strawberries have been grown commercially for many years. Tourists can visit the strawberry farms and buy the fruit at roadside stalls close to the strawberry farms. Strawberries are only grown to sell to tourists at a high price.

There is 1 large vineyard and winery that was established in 1995 by a wealthy family from Bangkok. The vineyard and tourism directly benefit each other. Tourists are allowed to drive around the vineyard to observe grape production and taste wine free of charge at the on-farm shop, where they can buy bottles of wine.

Despite their profitability, the number of farms growing specialty crops is limited by many factors. Their cultivation requires specialized skills and knowledge that are difficult to acquire and only a few farmers possess. In the case of flower farmers, they need detailed knowledge of the growing requirements of each species; only a few of them are able to successfully grow roses and poinsettias. Shiitake mushrooms are vulnerable to disease, which only some farmers have the skills to control. Even people who previously worked on mushroom farms, or who attended a training course organized by the district agricultural office before establishing their own farms, were unable to successfully control diseases and therefore stopped growing mushrooms. Growing specialty crops also needs high initial investments. Flower farms also require an abundant supply of water for irrigation and a good location alongside the main road, where they are easily visible to passing vehicles. One farmer who moved her flower farm from inside the village to a site next to the main road said she now has many more customers than before the move. However, the supply of suitable land in the district is limited. Most roadside land is owned by rich people from outside the district from whom most flower farmers rent the land.

Other farms: Other crops related to agrotourism include fruits such as lychees, sweet tamarinds, mangoes, bananas, longans, and dragon fruit and vegetables such as lettuce, cabbage, Chinese cabbage, kale, chili, and yardlong beans. Small quantities of these crops are sold to tourists via roadside stalls, local markets, and restaurants, but most of them are sold wholesale to middlemen from outside of the district. Gourds, which were formerly grown as vegetables consumed by the farmers, are now produced by some farmers to sell to souvenir producers.

Souvenir producers: Souvenirs made in the district include gold- and silver-decorated gourds (Figure 4), knitted clothes, hats and gloves, and Phu Ruea T-shirts and key rings. There are about 100 people producing souvenirs. Some sell their products directly to tourists via roadside stalls, shops at the flower festival, or their own shops, while others sell them wholesale to roadside sellers, souvenir shops, or middlemen from other provinces.

Roadside stalls, souvenir shops, and local markets: Roadside stalls and souvenir shops, which are located along the main road, are important marketing outlets for selling agricultural products and souvenirs to tourists. There are about 30 permanent stalls that sell both agricultural products and souvenirs year round. These products are both locally produced and imported. There are 35 temporary stalls that sell seasonal agricultural products such as lychees (April–May), longans and dragon fruit (July–August), and oranges and jujube (November–December). Lychees, longans, and dragon fruit are all locally grown and imported, whereas oranges and jujubes are imported from nearby districts. Local farmers sell their products to tourists from stalls at the local market. Restaurants catering for tourists also buy farm produce at the market, which features both local and imported produce. In addition, there are 2 large souvenir shops located in Phu Ruea. These shops sell mainly products imported from other districts or provinces, with only 20% of their stock locally made.

Tourism service enterprises: There are 3 large resorts, 47 small resorts and hotels, and 7 large restaurants that cater to tourists visiting the district. Most of these enterprises are owned and operated by local businesspeople. They buy locally grown shiitake mushrooms and other agricultural products to serve to their tourist customers. They also employ many members of local farm households as maids, waiters, gardeners, and receptionists.

Tourists can rent cars with drivers to take them to visit local tourist destinations. There are about 100 rental cars that are owned and operated by local people. However, the number of rental-car operators is limited by a cartel controlled by local officials.

FIGURE 4 Workers transforming gourds into souvenirs. (Photo by Sukanlaya Choenkwan)



Hired workers: There are about 1000 hired workers, most of whom (90%) are local residents from farm households. The remaining 10% are temporary migrants who come mostly from Laos. Maids in the hotels or resorts are usually middle-age females, and waitresses in the restaurants are usually young females. Workers on the flower farms are usually middle-age people of both sexes.

Most local workers only perform tourism-related work during the high season from October to February, when there is little work on their own farms. The daily wage for these laborers is usually US\$ 8.50 but can reach US\$ 14 during the high season. Many farm owners complain that it is difficult to hire local people because they constantly seem to be busy. Moreover, some maize and cassava farmers complain that local laborers prefer working on flower farms because the work is easier and the pay is better. Thus, to attract local laborers, farmers have to pay higher wages, increasing their costs. Therefore, they often hire migrant laborers from Laos, who are willing to work harder and accept lower wages than are Thai laborers. However, the Lao migrants generally prefer to work in bigger cities in

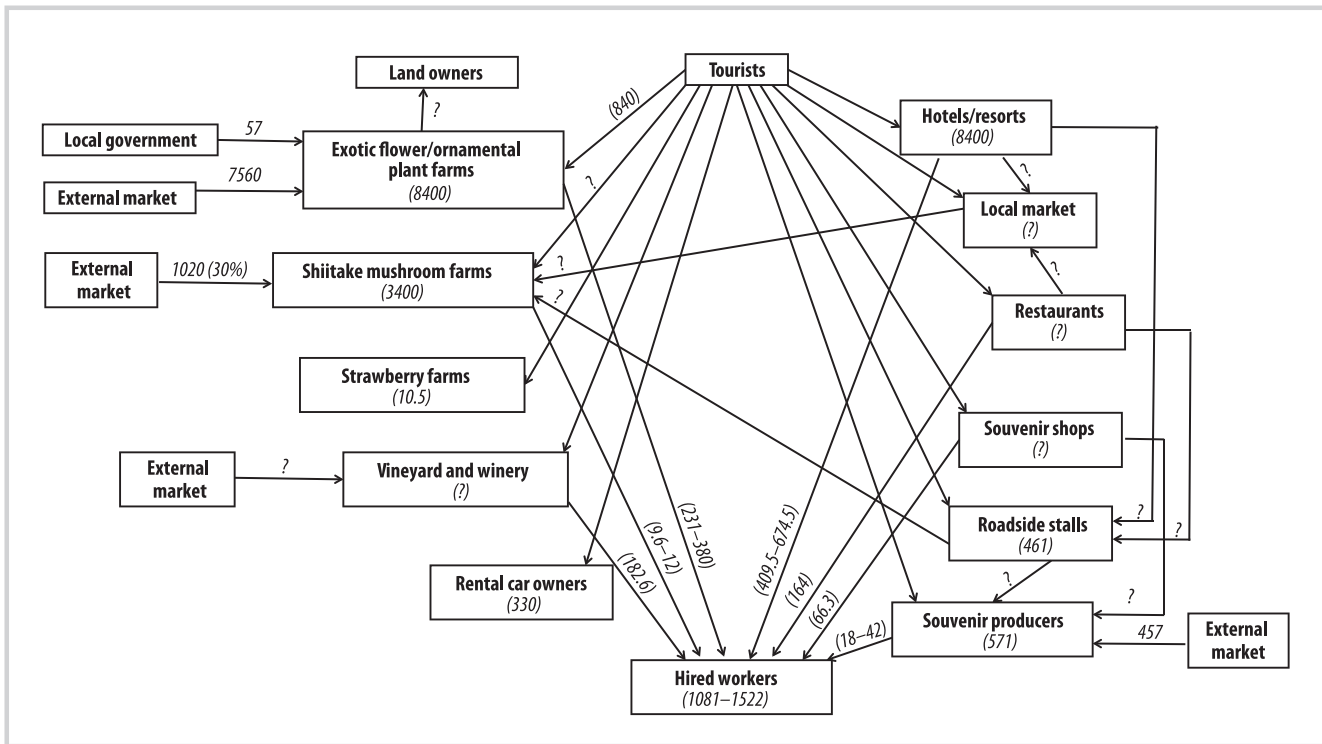
Thailand, so farmers in Phu Ruea encounter difficulties in recruiting enough workers to meet their needs. There are about 300 migrant laborers from Laos working in this district, mostly on cassava and maize farms, although about 50 are employed in tourism service enterprises.

Benefits of the Phu Ruea agrotourism system

The Phu Ruea agrotourism system generates a large amount of income for the district and creates many employment opportunities for local people. The income from agrotourism is shared among specialty-crop farmers, tourism enterprises, agricultural workers, land owners renting land to farmers, and members of farm households employed by tourism enterprises. Figure 5 traces the flows of gross income in the agrotourism system.

As shown in Table 1, the total annual gross income generated in the district by this system in 2014 was almost US\$ 16 million, of which almost US\$ 12 million (74% of the total) came from the sales of specialty-crop farms, which are mostly operated by local people. These specialty-crop farms generate very high net income per

FIGURE 5 Flows of gross income (×US\$ 1000) in the Phu Ruea agrotourism system; flows to middlemen are not shown.



hectare. The flower farms generate about US\$ 22,300/ha/y. Although most flower farms are quite small, with an average area of only 0.5 ha, they can generate net income of US\$ 30/d, which is more than 3 times the minimum daily wage in Thailand. The mushroom farms generated US\$ 58,000/ha/y, and the strawberry farms generated about US\$ 35,700/ha/y. The income per hectare earned by specialty crops is much higher than the US\$ 1900/ha earned from conventional field crops (eg cassava and maize) in the northeastern mountains (Choenkwan 2015).

Although the flower farms receive only 10% of their total income from direct sales to tourists, they gain some additional income from selling their products to local government agencies for the annual flower festival. An additional indirect benefit comes from the publicity that the flower farms receive from tourism promotion: this attracts more middlemen to the district, thus increasing their sales. Before the promotion of agrotourism, many consumers were unaware that Phu Ruea was an important source for ornamental plants and exotic flowers.

The mushroom farmers have also benefited from agrotourism. While not selling directly to tourists, they benefit from the increased demand for their produce from local hotels and restaurants catering to tourists. Before, the growers had to transport their mushrooms to sell in other provinces, but since tourism became popular

in Phu Ruea, they can sell all their mushrooms in the district, sometimes even producing too little to meet local market demand.

Roadside stalls, souvenir producers, and rental-car services—all enterprises owned by local people, mostly farmers—generate gross income of about US\$ 1.4 million/y. The resorts, hotels, and restaurants generate annual gross income of about US\$ 2.8 million (comprising 18% of their total income) from agrotourism. Although most (70%) of these enterprises are owned by residents of the district, they are not farmers. Instead, most owners are government officials who moved to the district on official assignments and could afford to buy land and invest in establishing tourism enterprises. The total gross income of hired workers is about US\$ 1–1.5 million, of which about US\$ 600,000–800,000 is earned from tourism service enterprises and the rest comes from farms and souvenir producers. Most local hired workers are from farm households.

About 1500 people directly earn an income from the agrotourism system, of whom approximately one-third are owners of their own farms or enterprises and two-thirds are hired workers. Most (90%) are local residents, which represents about 10% of the working-age population (15–60 years old) of the district (Official Statistics Registration Systems 2015). If only 1 person per household was involved in the system, then about 22% of all households in the district would directly benefit from

TABLE 1 Information on components of the Phu Ruea agrotourism system.

Enterprises	Areas (ha)	No. of enterprises	Estimated no. of hired workers	Required labor: estimated d/y	Wages (US\$ ^a /d)	Estimated gross income of enterprises (US\$/y)	Estimated gross income of hired workers (US\$/y)
Exotic flowers and ornamental plant farms	112	209	418	27,170	8.50–14.00	8,400,000 ^b	230,945–380,380
Shiitake mushroom farms	2.8	9	45	1125	8.50–11.00	3,400,000 ^b	9562–12,375
Vineyard and winery	400	1	90	21,480	8.50	NA ^c	182,580
Strawberry farms	0.3	2	0	0	0	10,500	0
Small resorts or hotels ^d	7.5	47	188	41,548	8.50–14.00	1,800,000 ^f	353,158–581,672
Large resorts or hotels ^e	9.5	3	30	6630	8.50–14.00		56,355–92,820
Large restaurants	0.3	7	70	19,292	8.50	1,000,000 ^f	163,982
Large souvenir shops	0.3	2	25	7800	8.50	NA ^c	66,300
Roadside stalls	0.04	65	0	0	0	461,500	0
Souvenir producers	0	100	100	3000	6.00–14.00	571,000	18,000–42,000
Rental-car owners	0	100	0	0	0	330,000	0
Total	532.74	545	966	128,045	6.00–14.00	15,973,000	1,080,882–1,522,109

^aUS\$ 1 = 35 Thai baht in July 2015.

^bLoei Provincial Agricultural Extension Office 2014.

^cNA, not applicable.

^dGross income less than US\$ 51,400/y.

^eGross income more than US\$ 51,400/y.

^fLoei Provincial Office of the Comptroller General Center 2014.

agrotourism, but because some households are likely to have more than 1 member involved in these activities, the actual percentage is probably somewhat lower. Nevertheless, the agrotourism system provides incomes to a substantial number of residents of the district, most of whom are farmers or members of farm households. Similar findings about the benefits of agrotourism to farmers have been reported by other researchers.

Schilling et al (2012, 2014) and Jeczmyk et al (2015) found that agrotourism enhances farmer incomes. Das and Rainey (2010) also found that it generates more jobs, which helps to reduce the unemployment rate. Jeczmyk et al (2015) emphasized that agrotourism not only helps increase farm incomes but is also a crucial channel for farmers to sell their products directly to tourists and tourism enterprises. However, Schilling et al (2012, 2014)

reported that agrotourism does not equally improve all farm household incomes: it mainly benefits small-scale farms.

Conclusions

This study shows that agricultural system analysis can help to identify both direct and indirect benefits of agrotourism to the local population. Benefits from agrotourism promotion are not limited to farmers who grow specialty crops; other local farm households benefit from associated job creation and employment opportunities in the tourism services sector. Farmers obtain a direct income from the sale of their products to tourists. They also earn an income from the sale of their crops to middlemen who resell this produce to tourists at roadside stalls or the local market, as well as to hotels and restaurants that serve locally grown food to their customers. Thus, in the case of shitake mushrooms, 70% are sold to middlemen who either resell them to local hotels and restaurants or to tourists shopping at roadside stalls or at the local market. The flower farms earn additional income by selling flowers to local government agencies for display at the annual flower festival, which attracts many tourists to the district. Farm households also supplement their income through the wages earned by household members employed by tourism enterprises. The influx of tourists helps to create employment opportunities for local people, who are mostly from farm households, working as roadside stall vendors, souvenir producers, and rental-car drivers. It also helps to increase market demand for fruits, gourds, and vegetables grown by other local farmers, thereby increasing their household incomes. A considerable share of the income generated by agrotourism flows to nonfarmers, including the owners of

large hotels and resorts (many of whom are government officials who moved to the district from other places), as well as the wealthy outsiders who own land alongside the main road that they rent to the flower farmers. But there is no doubt that many local farmers derive significant benefits from their involvement in the agrotourism system of Phu Ruea.

However, because this conclusion is based on a single case study of one mountain district in northeast Thailand, it needs to be replicated in different types of agrotourism systems in mountain areas in other parts of the world. Also, this study was limited to assessing the short-term economic benefits gained by farmers from agrotourism in Phu Ruea and did not address issues of agrotourism's environmental and social impacts and externalities nor examine the long-term sustainability of the system. These are issues that deserve further research in the future.

Although it has benefited farmers in the case of Phu Ruea, agrotourism is not a magic strategy to solve all the problems of agricultural development in mountain environments in northeast Thailand or elsewhere in the world. Therefore, development planners seeking to extend agrotourism into new areas should recognize that only some mountain areas are endowed with the scenic landscapes and pleasant climates sought by tourists and only some of these locations are easily accessible from large population centers. Moreover, even in those areas where local conditions are suitable for development of agrotourism, only some mountain farmers have the knowledge, skills, and resources needed to take advantage of the opportunities offered by such development. Nevertheless, our study shows that under the appropriate circumstances, agrotourism development can be beneficial to mountain farmers.

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REFERENCES

- Ariffin ARM.** 2014. Sustainable highland development through stakeholders' perceptions on agro eco tourism in Cameron highlands: A preliminary finding. *SHS Web of Conferences* 12:1–6.
- Bowen RL, Cox LJ, Fox M.** 1991. The interface between tourism and agriculture. *Journal of Tourism Studies* 2(2):43–54.
- Brscic K.** 2006. The impact of agrotourism on agricultural production. *Journal of Central European Agriculture* 7(3):559–563.
- Busby G, Rendle S.** 2000. The transition from tourism on farms to farm tourism. *Tourism Management* 21:635–642.
- Chamroonsiri A.** 2002. *Tourism and Socio-economic Cultural Changes: A Case Study of Tambon Nongbua, Amphoe PhuRuea, Changwat Loei* [in Thai] [Master's dissertation]. Loei, Thailand: Rajabhat Institute Loei.
- Che D, Wargenau A.** 2011. Visiting winery tasting rooms: Venues for education, differentiation and direct marketing. In: Torres MT, Momsen JH, editors. *Tourism and Agriculture New Geographies of Consumption Production and Rural Restructuring*. New York, NY: Routledge, pp 192–204.
- Choenkwan S.** 2015. *Agricultural Systems in the Mountains of Northeastern Thailand* [PhD dissertation]. Khon Kaen, Thailand: Khon Kaen University.
- Choenkwan S, Fox JM, Rambo AT.** 2014. Agriculture in the mountains of northeastern Thailand: Current situation and prospects for development. *Mountain Research and Development* 34(2):95–106.
- Choo H, Petrick JF.** 2014. Social interactions and intentions to revisit for agrotourism service encounters. *Tourism Management* 40:372–381.

- Conway GR.** 1985. Agroecosystem analysis. *Agricultural Administration* 20:31–55.
- Cox LD, Fox M, Bowen RL.** 1995. Does tourism destroy agriculture? *Annals of Tourism Research* 22(1):210–213.
- Das BR, Rainey DV.** 2010. Agritourism in the Arkansas Delta byways: Assessing the economic impacts. *International Journal of Tourism Research* 12: 265–280.
- Department of Provincial Administration.** 2015. *Report on Population Size for Thailand in 2011* [in Thai]. Bangkok, Thailand: Department of Provincial Administration. http://stat.bora.dopa.go.th/xstat/pop54_1.html; accessed January 2013.
- Flanigan S, Blackstock K, Hunter C.** 2014. Agritourism from the perspective of providers and visitors: A typology-based study. *Tourism Management* 40:394–405.
- Fleischer A, Tchetchik A.** 2005. Does rural tourism benefit from agriculture? *Tourism Management* 26:493–501.
- Hermans D.** 1981. The encounter of agriculture and tourism a Catalan case. *Annals of Tourism Research* 8(3):462–479.
- Hjalager AM.** 1996. Agricultural diversification into tourism: Evidence of a European Community development programme. *Tourism Management* 7(2): 103–111.
- Jarvis A, Reuter HI, Nelson A, Guevara E.** 2008. *Hole-Filled SRTM for the Globe Version 4*. CGIAR-CSI SRTM 90m Database. <http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1>; accessed on 10 November 2012.
- Jeczmyk A, Uglis J, Graja-Zwolinska S, Mackowiak M, Spychala A, Sikora J.** 2015. Research note: Economic benefits of agritourism development in Poland—An empirical study. *Tourism Economics* 21(5):1120–1126.
- Kokko A.** 2011. *An Exploration of Agritourism: Topics, Literature and Areas for Future Research*. <http://annekokko.com/resources/an%20exploration%20of%20agritourism%20-%20akokko.pdf>; accessed on 21 April 2015.
- Loei Provincial Agricultural Extension Office.** 2014. *Annual Report in 2013: Loei Provincial Agricultural Extension Office* [in Thai]. Bangkok, Thailand: Department of Agricultural Extension, Ministry of Agriculture and Cooperatives.
- Loei Provincial Office of the Comptroller General Center.** 2014. *Loei, Thailand: Gross Provincial Product Statistics of Loei* [in Thai]. Loei, Thailand: Governor's Office.
- Marten GG, editor.** 1986. *Traditional Agriculture in Southeast Asia: A Human Ecology Perspective*. Boulder, CO: Westview Press.
- McConnell DJ, Dillon JL.** 1997. *Farm Management for Asia: A Systems Approach*. Rome, Italy: Food and Agricultural Organization of the United Nations.
- Mongkolsawat C, Suvanweerakhamtorn R, Phaibunsak S, Chankasem U, Thanajaturon T, Wattanakij N.** 1994. *Northeast Thailand: Spatial Potentials for Development* [in Thai]. Khon Kaen, Thailand: Geo-Informatics Center for Development of Northeast Thailand, Khon Kaen University.
- Na Songkhla T, Somboonsuke B.** 2012. Impact of agro-tourism on local agricultural occupation: A case study of Chang Klang district, southern Thailand. *Journal of Agricultural Technology* 8(4):1185–1198.
- Na Songkhla T, Somboonsuke B.** 2013. Interactions between agro-tourism and local agricultural resources management: A case study of agro-tourism destinations in Chang Klang district, Southern Thailand. *Discourse Journal of Agriculture and Food Sciences* 1(3):54–67.
- National Statistics Office.** 2013. *Statistics of Rainfall at Meteorology Stations, 2000–2012* [in Thai]. <http://service.nso.go.th/nso/web/statseries/statseries27.html>; accessed on 16 September 2013.
- Nong Bua Sub-district Administrative Organization.** 2014. *Lists of Organization Visiting to Farmer Groups in Nong Bua Sub-district in 2013* [in Thai]. Loei, Thailand: Nong Bua Sub-district Administrative Organization.
- Official Statistics Registration Systems.** 2015. *Number of Population Divided by Age, Phu Ruea District, Loei Province* [in Thai]. http://stat.dopa.go.th/stat/statnew/upstat_age_disp.php; accessed on 18 October 2015.
- Phillip S, Hunter C, Blackstock K.** 2010. A typology for defining agritourism. *Tourism Management* 31:754–758.
- Phu Ruea National Park.** 2014. *Number of Tourists in Phu Ruea National Park in 2013* [in Thai]. Loei, Thailand: Phu Ruea National Park.
- Rambo AT, Sajise PE, editors.** 1984. *An Introduction to Human Ecology Research on Agricultural Systems in Southeast Asia*. Los Baños, Philippines: University of the Philippines at Los Baños.
- Rilla EL.** 2011. Tourism and agricultural viability: Case studies from the United States and England. In: Torres MT, Momsen JH, editors. *Tourism and Agriculture New Geographies of Consumption Production and Rural Restructuring*. New York, NY: Routledge, pp 173–191.
- Rogerson CM, Rogerson JM.** 2014. Agritourism and local economic development in South Africa *Bulletin of Geography, Socio-Economic Series* 26: 93–106.
- Schilling BJ, Attavanich W, Jin Y.** 2014. Does agritourism enhance farm profitability? *Journal of Agricultural and Resource Economics* 39(1):69–87.
- Schilling BJ, Sullivan KP, Komat SJ.** 2012. Examining the economic benefits of agritourism: The case of New Jersey. *Journal of Agriculture, Food Systems, and Community Development* 3(1):199–214.
- Shaffril HAM, Hamzah A, Yassin SM, Samah BA, D'Silva JL, Tiraeyari N, Muhammad M.** 2015. The coastal community perception on the socio-economic impacts of agro-tourism activities in coastal villages in Malaysia. *Asia Pacific Journal of Tourism Research* 20(3):295–313.
- Srisomyong N.** 2010. Agricultural diversification into agritourism: The case of Thailand. *International Journal of Agricultural Travel and Tourism* 1(1):107–118.
- Torres RM.** 2011. Life between the two milpas: Tourism, agriculture and migration in the Yucatan. In: Torres MT, Momsen JH, editors. *Tourism and Agriculture New Geographies of Consumption Production and Rural Restructuring*. New York, NY: Routledge, pp. 47–71.
- Torres RM, Momsen J.** 2011. Introduction. In: Torres MT, Momsen JH, editors. *Tourism and Agriculture New Geographies of Consumption Production and Rural Restructuring*. New York, NY: Routledge, pp. 2–9.
- Wicks BE, Merrett CD.** 2003. Agritourism: An economic opportunity for Illinois. *Rural Research Report* 14(9):1–8.